Originals

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Taxonomic Notes on *Ophiopogon* of South Asia I

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Ophiopogon malcolmsonii, O. micranthus, O. brevipes, O. subverticillatus and *O. humilis* were reduced to *O. longifolius*. *Ophiopogon longifolius* occurs in E. India, Myanmar, Thailand, Cambodia, Laos and Vietnam. A form with white-striate leaves is sometimes cultivated in SE. Asia and the southern part of E. Asia, including Vietnam, S. China, and Isl. Okinawa, Japan. Diagnostic characters of *O. longifolius* were also noted.

Genus *Ophiopogon* of South Asia has so far been investigated by many taxonomists (Blume 1827–under *Chloopsis*, Hooker 1892, Craib 1912, Rodriguez 1934, Larsen 1961, Jessop 1979, etc.), but our current knowledge of it still seems insufficient. The area principally covered in this study includes such countries as Pakistan, India, Bangladesh, Sri Lanka, Nepal, Bhutan, Myanmar, Thailand, Laos, Cambodia, Vietnam, Malaysia, Singapore, Philippines, Brunei and Indonesia, irrespective of the occurrence of *Ophiopogon*. Some remarks on *Ophiopogon* not occuring in this area may also be made when necessary.

(1) *Ophiopogon longifolius* and the identity of *O. micranthus*, *O. malcolmsonii*, *O. brevipes*, *O. subverticillatus* and *O. humilis*

Six species of *Ophiopogon*, *O. longifolius* Decne., *O. micranthus* Hook. f., *O. malcolmsonii* Royle ex Hook.f., *O. brevipes* Craib, *O. subverticillatus* Gagnep. ex L. Rodr. and *O. humilis* L.Rodr. have so far been treated as distinct species. It is true that the type specimens of each species (Figs. 1–7) shows some uniqueness, respectively. For instance, the type specimen of *O. longifolius* (Figs, 1, 7A) is unique in having fairly elongate leaves and small flowers. The type specimen of *O. micranthus* (Figs. 2, 7B) is characterized by its small flowers, *O. malcolmsonii* (Figs. 3, 7C) has fairly slender styles, *O. brevipes* (Figs. 4, 7D) is characterized by its short scape, *O. subverticillatus* (Figs. 5, 7E) has a relatively long scape overtopping the leaves, *O. humilis* (Figs. 6, 7F) has slender styles, short leaves and scapes, etc. However, these characteristics of the type specimens of the six species seem to be too weak to guarantee their respective specific status. For example, the type specimens (2 sheets) of *O. humilis*, of which one is shown in Figs. 6 and 7, may certainly give the impression that this species is somewhat small (low) in habit. Actually Rodriguez (1934) regarded this habit as a characteristic of this species and gave the name indicating it ('*humilis*') to the plant. However, in these specimens older leaves are lost (maybe burnt out) from the base, and instead relatively short, newly developing leaves are borne. This condition of the specimens must be taken into account when one assesses the habit of this species properly. Further, a survey of many other specimens referable to these six species revealed that

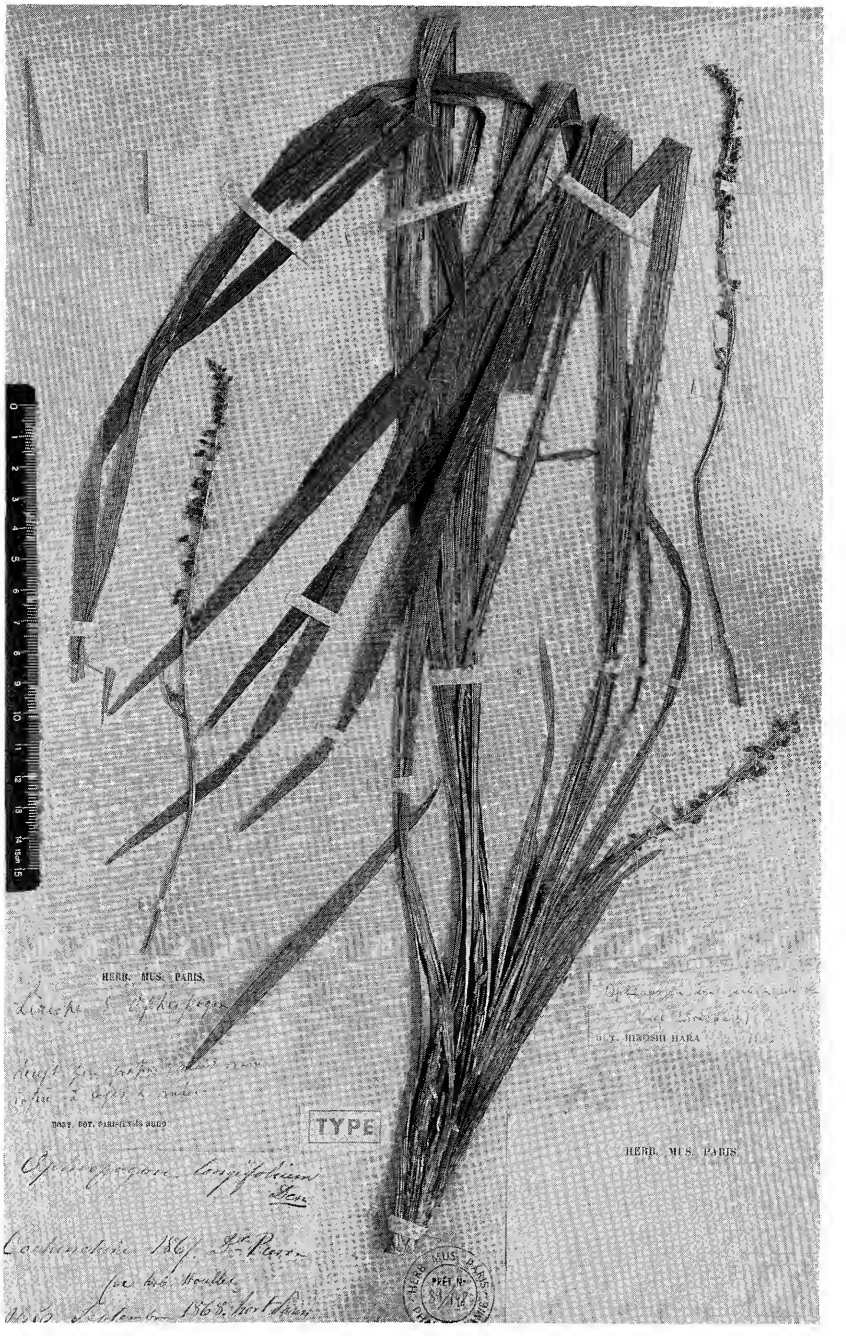

Fig. 1. Type specimen of *Ophiopogon longifolius* (Cochinchina, Pierre s.n., P).

there are many intermediate forms among them, and this condition apparently makes it difficult to distinguish them clearly. Accordingly, it seems more appropriate to treat all these six species as conspecific. This species, here circumscribed to include all these six species, shows a relatively broad range of variation in various characters such as floral size, form and

Fig. 2. Type specimen of *Ophiopogon micranthus* (Assam, Mack s.n., K).

thickness of styles, length of anthers and filaments, proportion in length of inflorescence to scape, scape length, leaf size, etc. But at the same time, it possesses the following characteristics: i.e., its roots are relatively thick, being up to ca. 4 mm in diameter; styles tend to be conical; length proportion of inflorescence to scape is usually relatively high, ca. (1/4–)

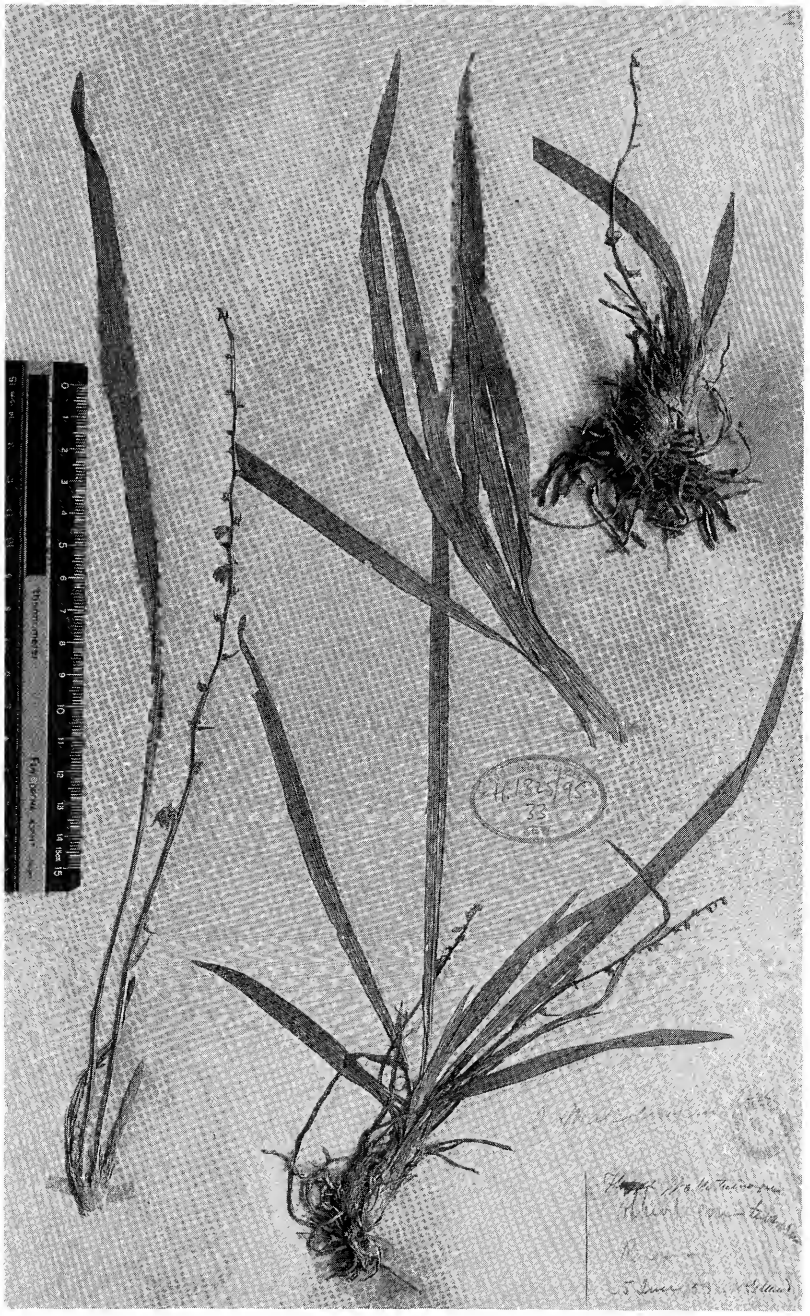

Fig. 3. Type specimen of *Ophiopogon malcolmsonii* Royle ex Hook.f. (Rangoon, McLelland s.n., K).

1/3–1/2 or slightly more; and scapes, which are more or less complanate, are not always 2-winged. By these characteristics this species seems to be distinguishable from the other species of the same genus. The correct name for this species is *O. longifolius*, and the other five names are synonymized under *O. longifolius*.

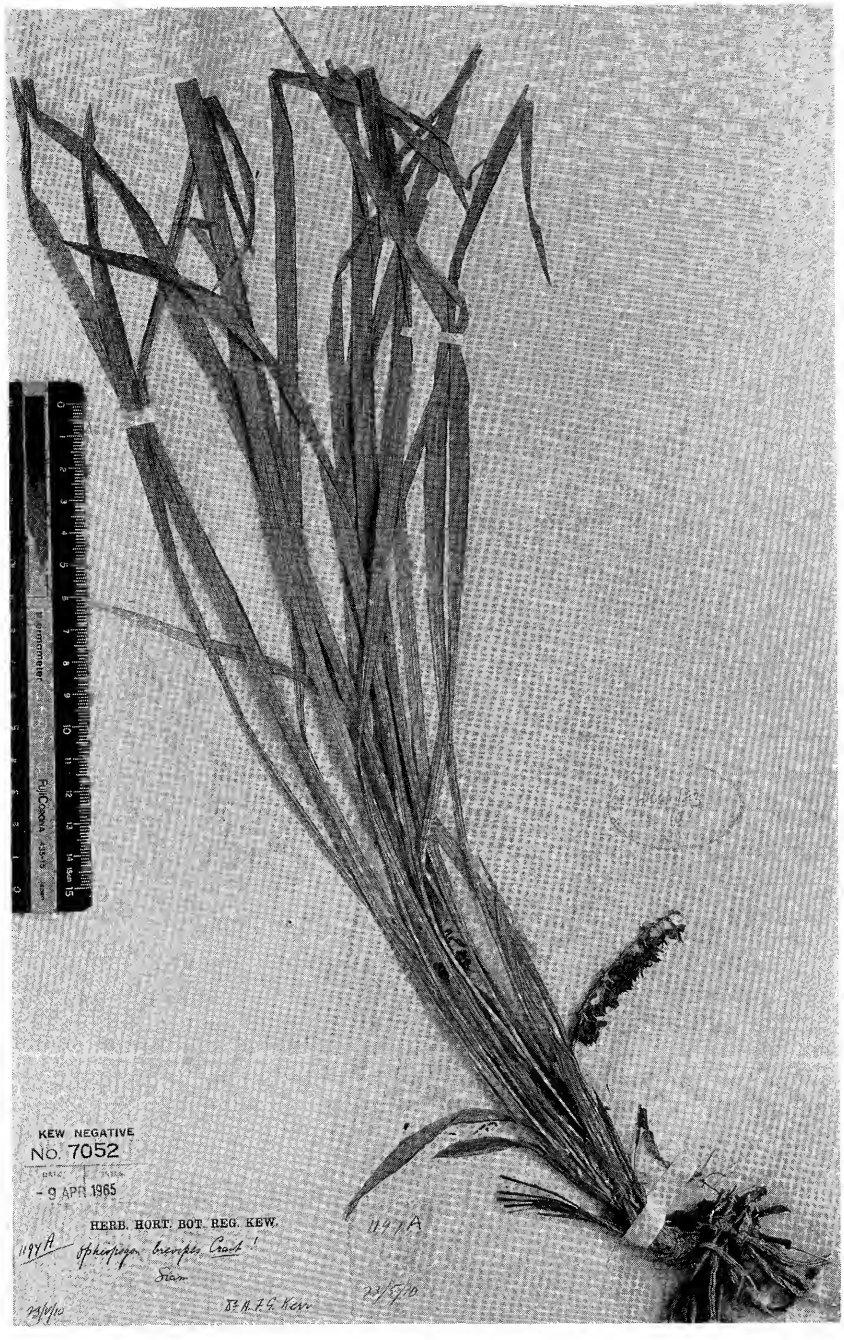

Fig. 4. Type specimen of *Ophiopogon brevipes* (Thailand, A.F.G. Kerr 1197A, K).

Ophiopogon aciformis F.T. Wang & Ts. Tang ex H. Li & Y.P. Yang, described from the southwestern part of Yunnan Province of China, resembles *O. longifolius*. Above all, it seems noteworthy that *O. aciformis* has a conoidal style (Yang and Li 1990, Yang 1997), since it is also characteristically possessed by many individuals of *O. longifolius*. Although

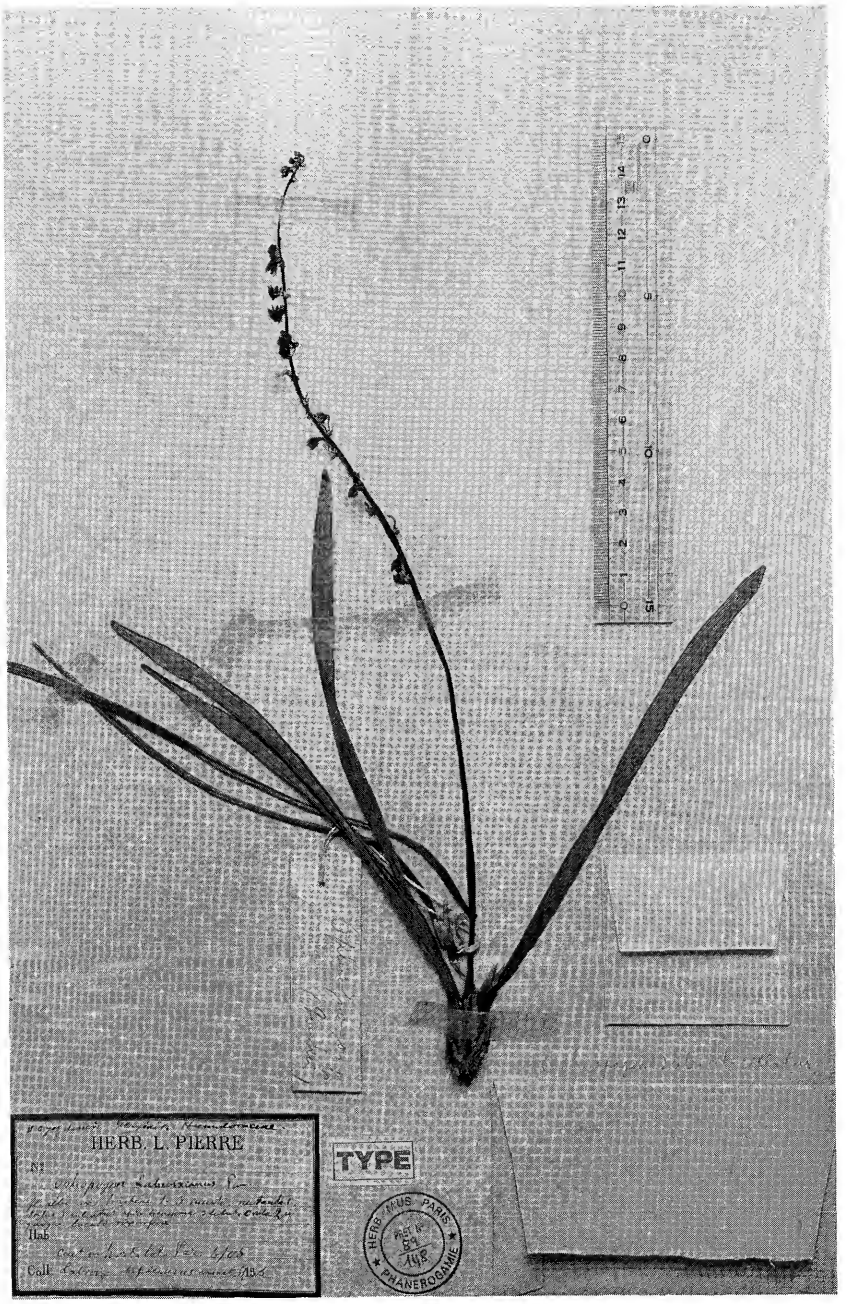

Fig. 5. Type specimen of *Ophiopogon subverticillatus* (Tonkin, cult. at Bot. Gard., Mus. Paris, P).

I still have not had an opportunity to examine the type specimen of *O. aciformis*, there seems to be a possibility that this species is also conspecific with or closely allied to *O. longifolius*. Further study is needed to clarify the relationship between the two species.

Ophiopogon longifolius with white-striped leaves is sometimes (or often) cultivated in

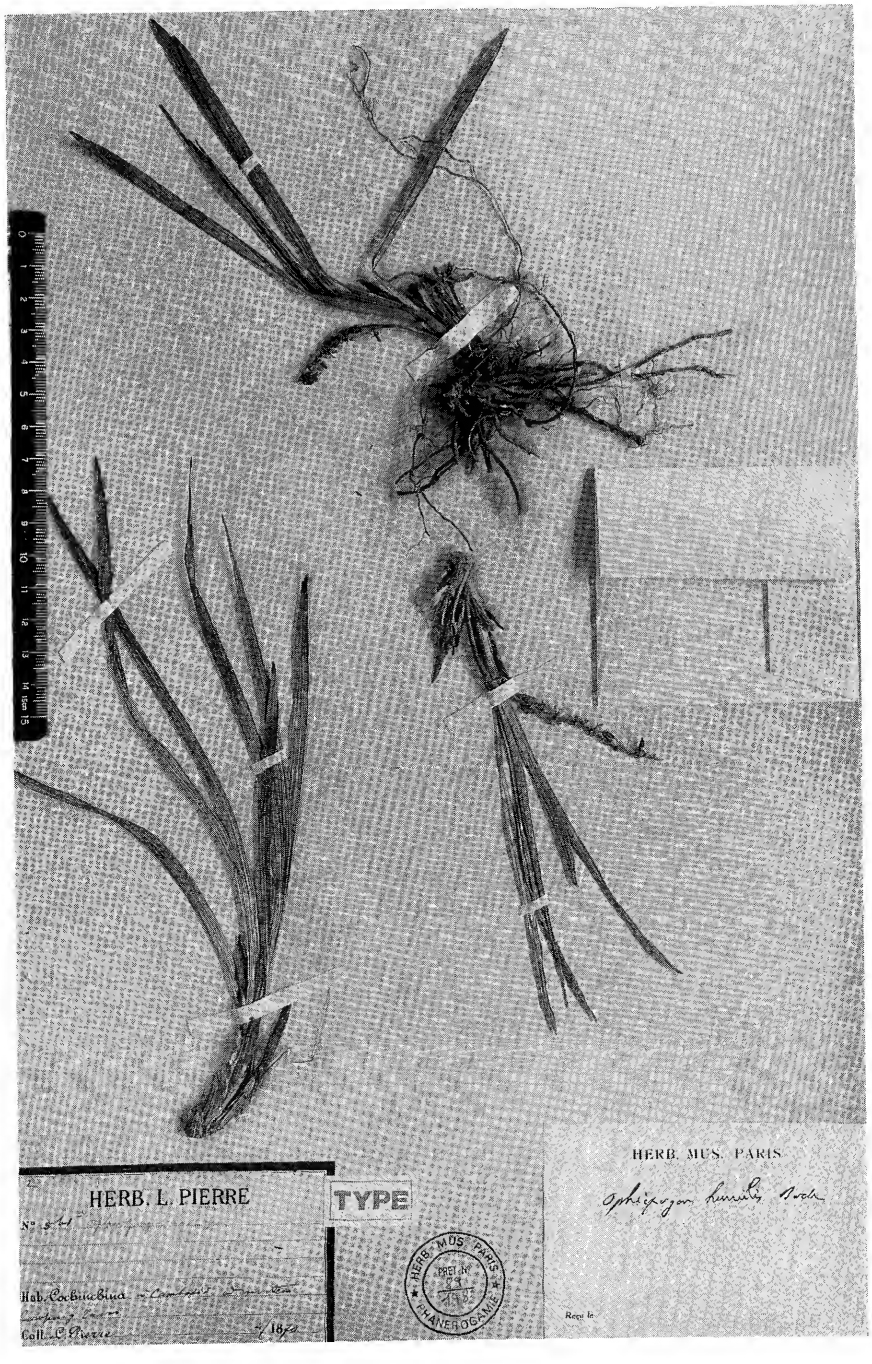

Fig. 6. Type specimen of *Ophiopogon humilis* (Cambodia, Pierre 561, P).

SE. Asia and the southern part of E. Asia. I have seen this form cultivated at some botanical gardens or institutions (e.g., Yunnan Institute of Tropical Botany at Xishuangbanna, China) as well as in parks, yards or other places [e.g., in Hong Kong (both Kowloon and Hong Kong Isl.); Simao, a city in the southwestern part of Yunnan Province of China; and Okinawa

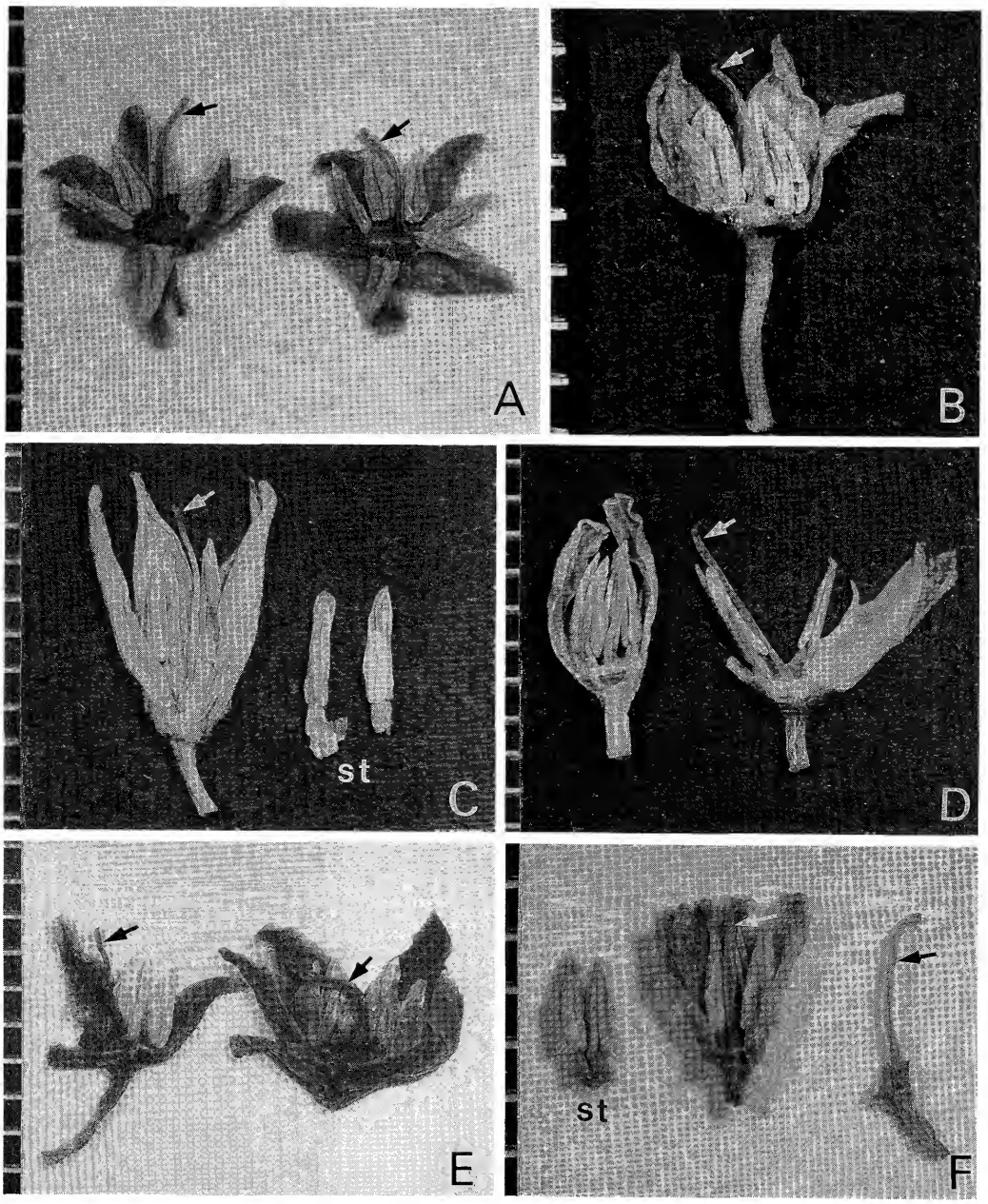

Fig. 7. Close-ups of flowers from the type specimens of six species of *Ophiopogon*. A. *O. longifolius* (specimen same as Fig. 1). B. *O. micranthus* (specimen same as Fig. 2). C. *O. malcolmsonii* (Pegu, Myanmar, McLelland s.n., K). D. *O. brevipes* (Thailand, A.F.G. Kerr 1197, K). E. *O. subverticillatus* (specimen same as Fig. 5). F. *O. humilis* (specimen same as Fig. 6). st: stamen. Arrows indicate styles. Scales in mm.

Isl. (Figs. 8, 9) of the Ryukyus of Japan]. In these areas this species has been misidentified or unnamed, and hence there has been no record of its cultivation under the name of *O. longifolius*. Among the herbarium specimens I have examined, there was one specimen of this species bearing white-striped leaves from a cultivated source in Vietnam (Dalat, S.H.

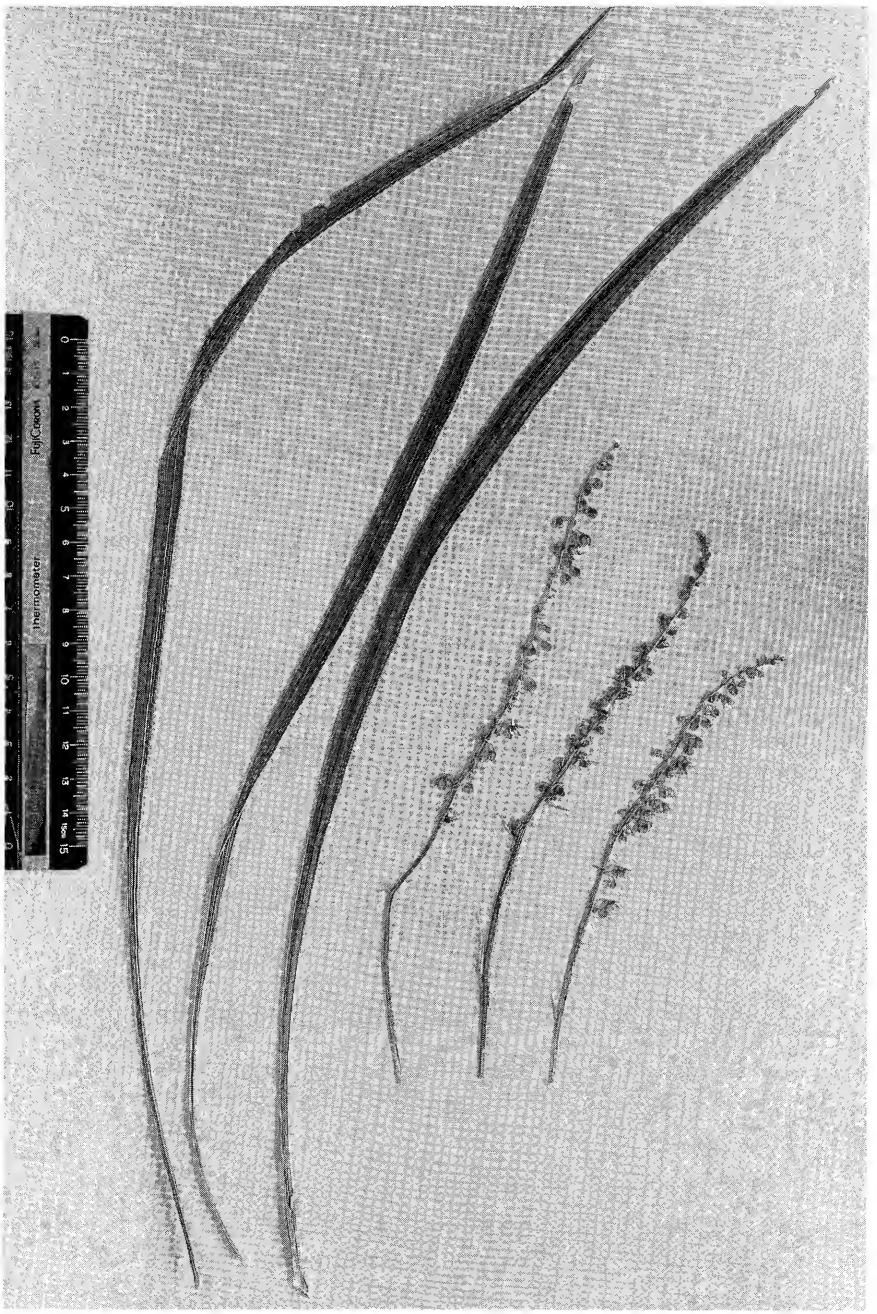

Fig. 8. *Ophiopogon longifolius* with white-striped leaves from Okinawa Isl. of Japan (cult. at Teikyo Univ., Tokyo; N.Tanaka s.n., Sept. 1991, Teikyo Univ.).

Vu-Van-Cuong 540, P). A specimen from a cultivated source in Thailand (Bangkok, A.F.G. Kerr s.n., BM) is also very similar to this form, but in this specimen I could not confirm the presence of white stripes on its leaf. As I have observed in Hong Kong that *O. longifolius* with white striped leaves occasionally produces leaves perfectly lacking white stripes,

Fig. 9. A living plant of *Ophiopogon longifolius* with white-striped leaves cultivated at Teikyo Univ. (originally from a cultivated source in Isl. Okinawa, Japan). A. A flowering scape and several leaves. Flowers white. Photographed on Aug. 13, 1996. B. Close-up of a flower. Top: three tepals are removed to show the inside. Bottom: two tepals (left: outer one, right: inner one). The flower is from the plant shown in Fig. A. Scale in B is in mm.

the specimen from Thailand may also be this form. Hatusima and Amano (1977, 1994) listed the name of *O. intermedius* D. Don cv. *Argenteo-marginatus* in their 'Flora of the Ryukyus'. I have never seen the plants corresponding to this cultivar in the Ryukyus. There seems to be a possibility that the name of this cultivar was applied by them to *O. longifolius* with white-striped leaves. Thorel noted on the label of his specimen (no. 412, K) from Cochinchina that his plant, which is referable to *O. longifolius* in my opinion, is spontaneous or cultivated. As the leaves of his specimens (Thorel 412, K, P) are not white-striped, *O. longifolius* without white stripes on leaves may also have been in cultivation there.

Ophiopogon longifolius Decne., Fl. des Serres **18**: 182 (1867); L. Rodr. in Lecomte, Fl. Génér. Indo-Chine **6**: 661 (1934); P.H. Hô, Illust. Fl. Vietnam **3**(1): 584, n.8736 (1993).

Liriope graminifolia (L.) Baker in J. Linn. Soc. **17**: 499 (1879), p.p., quoad syn. *O.*

longifolius.

Flueggea japonica Rich. var. *wallichiana* (Kunth) Baker in J. Linn. Soc. **17**: 501 (1879), '*Fluggea*', p.p., quoad syn. *O. malcolmsonii.*

Ophiopogon malcolmsonii Royle [Illust. Bot. **1**: 382 (1839), nom. nud.; Baker in J. Linn. Soc. **17**: 501 (1879), pro syn. sub *Fluggea japonica* var. *wallichiana*] ex Hook.f., Fl. Brit. Ind. **6**: 269 (1892), '*malcolmsoni*'; Craib in Kew Bull. **10**: 411 (1912).

O. micranthus Hook.f., Fl. Brit. Ind. **6**: 269 (1892).

O. wallichianus (Kunth) Hook.f., Fl. Brit. Ind. **6**: 268 (1892), p.p., quoad syn. *O. longifolius.*

Liriope spicata auct. non Lour.: Wright in J. Linn. Soc. Bot. **36**: 79 (1903), p.p., quoad syn. *O. longifolius.*

Ophiopogon brevipes Craib in Kew Bull. **10**: 410 (1912); L. Rodr. in Lecomte, Fl. Indo-Chine **6**: 664 (1934); Char. in Thai Forest Bull., Bot. **8**: 92 (1974); M.N. Tamura in Acta Phytotax. Geobot. **41**: 5 (1990); in Shoei Jr. Coll. Ann. Rep. Stud. **23**: 63 (1991).

Mondo japonicum (L.f.) Farw. var. *micranthum* (Hook.f.) Farw. in Amer. Midl. Nat. **7**: 42 (1921), '*micranthus*'.

M. japonicum (L.f.) Farw. var. *wallichianum* (Kunth) Farw. in Amer. Midl. Nat. **7**: 42 (1921), p.p., quoad syn. *O. longifolius.*

Ophiopogon subverticillatus Gagnep. (mss. in P, nom. inval.) ex L. Rodr. in Bull. Soc. Bot. Fr. **75**: 997 (1928); in Lecomte, Fl. Indo-Chine **6**: 664 (1934).

[*O. labroixianus* Pierre (mss. in P) in L. Rodr. in Bull. Soc. Bot. Fr. **75**: 997 (1928), ut '*O. labroyanus*', nom. inval.; in Lecomte, Fl. Indo-Chine **6**: 664 (1934), pro syn. sub *O. subverticillatus*].

O. humilis L. Rodr. in Bull. Mus. Hist. Nat. Paris, ser. II, **6**: 95 (1934), in Lecomte, Fl. Indo-Chine **6**: 661 (1934).

O. intermedius auct. non. D. Don: Char. in Thai Forest Bull., Bot. **8**: 92 (1974), p.p.

? *O. intermedius* D.Don cv. *Argenteo-marginatus* in Hatus. & T. Amano, Fl. Ryukyus 199 (1977); 2nd ed., 305 (1994).

? *O. aciformis* F.T. Wang & Ts. Tang ex H. Li & Y.P. Yang in Y.P. Yang & H. Li in Acta Bot. Yunnan., suppl. **3**: 92 (1990); Y.P. Yang in C.Y. Wu, Fl. Yunnan. **7**: 684 (1997).

Perennial glabrous herb. Rootstock short, stout, rarely elongated. Roots fibrous, 1–4 mm in diameter, often partially thickened into fusiform tubers up to ca. 7 mm in diameter. Leaves many, tufted, linear to linear-oblanceolate, acute at or attenuate to both ends, vaginate at base with broad scarious margins, 20–91 cm long, 2.5–15.5 mm wide, 7–19-veined, minutely serrulate on margins. Scape usually shorter than leaves, 7–109 cm long, often curved or bent usually at or below the middle, more or less complanate, often fluted, often (or occasionally) 2-edged or very narrowly 2-winged, often purplish. Inflorescence racemose, 3–26 cm long, c.(1/4–)1/3–1/2 or slightly more of the entire scape. Pedicels (incl. the lower stalky part of the perianth) 3–10 mm long (true pedicels, excl. the perianth part, 1–4 mm long), jointed usually at or below the middle (occasionally above the middle). 1–5 flowers borne in each axil of a few fascicled bracts. Bracts ovate to narrowly lanceolate, acute, acuminate or aristate, with prominent midrib, scarious, often minutely serrulate on margins in the upper part, usually to c.2 cm long. Flowers cernuous, secund, campanulate, faintly fragrant, without nectar. Tepals 6, ovate to ovate-oblong, often recurved slightly in the upper part, 1-veined, 2.3–6.7 mm long, 1.3–3.0 mm wide, white (the lower stalky part of the perianth sometimes tinged purple) or pale lilac (Decaisne 1867). Anthers 6, introrse, ovate-lanceolate to lanceolate, cordate to saggitate at base, creamy to greenish, 1.4–4.2 mm long. Filaments short, 0.2–1.0 mm long. Style usually slenderly conical, 2.5–5.5 mm long. Ovary trilocular. Ovules 2 in each

ovarious locule. Seeds with sarcotesta, oblong.

Distribution: E. India, Myanmar, Thailand, Cambodia, Laos and Vietnam.

As Hooker (1892) noted, there seems to have been no authentic specimen by Royle for *O. malcolmsonii* Royle. When Hooker (1892) described this species, he cited the following specimens; "Pegu; at Rangoon, *M'Clelland, Kurz.* Attran, *Wallich*". I regard these specimens as the types of *O. malcolmsonii* Royle ex Hook.f. However, having not examined the Wallich's specimen from Attran (5139G of his Catalogue) as yet, I cannot refer to the identity of this specimen. Specimens collected by M'Clelland and Kurz are cited in 'specimens examined' below.

Representative specimens examined:

India. Assam, fl. & fr., Mack s.n. (**type** of *O. micranthus*, K); Bot. Gard. Calcutta, 1834–1841, fr., J.O. Voigt 375 (C, P).

Myanmar. Pegu, 1854, fl., McLelland s.n. (**syntype** of *O. malcolmsonii* Royle ex Hook.f., K); Pegu, Aug. 15, 1872, fr., S.Kurz 2626 (**syntype** of *O. malcolmsonii* Royle ex Hook.f., K); Rangoon, June 25, 1853, fl., McLelland s.n. (**syntype** of *O. malcolmsonii* Royle ex Hook.f., K); Upper Burma, alt. 4000 ft., June 1888, fl., H. Collett 737 (K).

Thailand. Tak, env. Ban Phu Pae (Mae Sot), alt. c.400 m, May 28, 1979, fl., J.E. Vidal et al. 6117, p.p. (P); Chiang Mai, Ob Luang, alt. c.1000 m, fls. white, June 11, 1968, fl., C.F. van Beusekom & C. Phengkhlai 1102 (P); Doi Sootep, Chieng mai, 2200 ft., May 23, 1910, fls white, fl., A.F.G. Kerr 1197, 1197a (**syntypes** of *O. brevipes*, K); Doi Sootep, 2400 ft., May 23, 1910, fl., A.F.G. Kerr 1198 (K); Nam Nao forest, Petchaboon, alt. 600 m, fls. white, fl., T. Smitinand 486 (P); Phitsanulok, Thung Salaeng Luang, west of Nakawn Thai road, alt. 400 m, July 24, 1966, fr., Larsen et al. 834 (P); Chiet, Ubon, c.100 m, May 21, 1932, fls. white, fl., A.F.G. Kerr 21824 (K); Phu Khieo, E. of Chaiyaphum, alt. 600–700 m, 1972, fr., K. Larsen & al. 31303 (2 sheets, P); Chaiyaphum, Ban Nam Phrom, alt. 600 m, inflorescence blueish violet, corolla white, May 24, 1974, fl., R. Geesink & al. 6903 (P, KYO); Southeastern distr., Chanthaburi, Khao Soi Dao, alt. 400 m, scented, June 14, 1960, fl., B. Sangkhachand 9 (P); Doi – ? alt. 1500–1600 ft., May 24, 1921, fl., A.F.G. Kerr 5501 (BM); Muok Lek, alt. 250 m, May 2, 1922, fl., A.Marcan 829 (2 sheets, BM); Bangkok, cultivated, Oct. 7, 1923, fr., A.F.G. Kerr s.n. (BM).

Cambodia. Compong Son, Apr. 1870, fl., L. Pierre 561 (2 sheets, **types** of *O. humilis*, P); Anlong Thma (Pursat), Apr. 26, 1966, fl., M.Martin 561 (L, P).

Laos. Pa (Da?) Bia, alt. 2400 m, Apr. 15, 1932, fl. (-bud), A.F.G. Kerr 21061 (BM).

Vietnam. Cochinchina, 1867, Pierre s.n. (Sept. 1868, fl., Hort. Paris.) (**type** of *O. longifolius*, P); Hortus Parisiensis, culta, 1876, fl., without collector's name (P); Cochinchine, 1862–1866, fl., Thorel 412 (2 sheets, P, K); Cultivé à Dalat, Aug. 22, 1967, fl., S.H.Vu-Van-Cuong 540 (P); Hue, Sept. 1872, fl., Harmand 6677 (P); Tonkin, Juillet 1930, fr., Pételot 3736 (P); Tonkin, without specified locality, cultivated at Bot. Gard., Mus. in Paris, June 1905, fl. (**type** of *O. subverticillatus*, P); Cochinchine, without specified locality, 1865–1877, fl., Pierre 6681 (P).

Japan. The Ryukyus, Isl. Okinawa, Kunigami-gun, Onna-son, Moon beach, cultivated, Jul. 29, 1990 (collected), transplanted at Teikyo Univ., Tanaka s.n., Aug. 12, 1990, fl.; ibid., Sept. 1991, fl. (Herb. Teikyo Univ.).

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(See also those cited in the text)

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田中教之：南アジア産ジャノヒゲ属の分類学的検討 I

タイプを含む多数の標本の検討の結果，*Ophiopogon longifolius*, *O. micranthus*, *O. malcolmsonii*, *O. brevipes*, *O. subverticillatus*, *O. humilis* の6種は同一種であるとの結論を得た．この種の正名は *O. longifolius* Decne. である．本種で葉に白条のあるものがしばしば栽培されており，筆者はこれを沖縄本島，中国の香港と雲南省で確認した他，ベトナムで栽培されているものの標本を今回検した．*O. longifolius*は花の大きさ，花柱の太さや形，花糸や葯の長さ，花茎の長さ，葉の長さや巾，等においてやや幅広い変異がある一方，比較的太い根を持ち，花序の花茎に対する長さの割合は通常比較的高く [ca.（1/4－）1/3－1/2 あるいはそれ以上]，花茎は多かれ少なかれ扁圧された傾向を示すが，縦走する2翼（ジャノヒゲ属ではしばしば発達が見られる）は必ずしも発達せず，発達してもその巾は大変狭いことが多く，花柱は（やや細めの）円錐状を呈する傾向が強い，などの特徴を持っている．本種はインド東部，ミャンマー，タイ，カンボジア，ラオス，ベトナムに分布している．

（帝京大学文学部教育学科）